



The Marwin Company, Inc.
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803-776-2396

**MATERIAL SAFETY
DATA SHEET**

MATERIAL SAFETY DATA SHEET

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| Trade Name: Carbon and High Strength Low Alloy Steels | Emergency Phone Number: (803) 776-2396 |
| Chemical Name: Steel | Issue Date: February 28, 2006 |
| Form: Sheet and Plate | Identification Number: Carbon and Alloy |

I. INGREDIENTS

| Material or Component | CAS Number | % of Weight | Exposure limits | |
|-----------------------|------------|----------------|--|---|
| | | | OSHA PEL (mg/m ³) | ACGIH TLV (mg/m ³) |
| Base Metal | | | | |
| Iron (Fe) | 7439-89-6 | Balance | 10 (Fe ₂ O ₃ Fume) | 5.0 (Fe ₂ O ₃ Fume) |
| Alloying Elements | | | | |
| Aluminum (Al) | 7429-90-5 | 0.01 - 0.25 % | None Listed | 5.0 as welding fume |
| Carbon (C) | 7440-44-0 | 0.001 - 1.5 % | None Listed | None Listed |
| Chromium (Cr) | 7440-47-3 | 0.01 - 1.1 % | 0.1 as chrome | 0.5 as chrome |
| Cobalt (Co) | 7440-48-4 | 0.05 % Max. | 0.1 as chrome and fume | 0.05 as fume |
| Copper (Cu) | 7440-50-8 | 0.01 - 0.20 % | 0.2 as copper; 1.0 as dust | 0.2 as fume; 1.0 as dust |
| Lead (Pb) | 7439-92-1 | > 0.10 % | 0.05 as fume & dust | 0.15 as dust and fume |
| Manganese (Mn) | 7439-96-5 | 0.01 - 2.0 % | 5 as manganese | 5 as dust; 1 as fume |
| Molybdenum (Mo) | 7439-98-7 | 0.01 - 0.25 % | 15 as insoluble compds. | 10 as insoluble compds |
| Nickel (Ni) | 7440-02-0 | 0.01 - 1.0 % | 1.0 as Nickel | 1.0 as Nickel |
| Phosphorous (P) | 7723-14-0 | 0.001 - 0.15 % | 0.1 as Phosphorous | 0.1 as Phosphorous |
| Silicon (Si) | 7440-21-3 | 0.01 - 1.0 % | None Listed | 10 total dust |
| Sulfur (S) | 7704-34-9 | 0.001 - 0.35 % | 13 sulfur dioxide | 5 sulfur dioxide |
| Tungsten (W) | 7440-33-7 | 0.001 - 0.05 % | None Listed | 5 insoluble compds. |
| Vanadium (V) | 7440-62-2 | 0.01 - 0.25 % | 0.5 dust; 0.1 fume | 0.05 dust and fume |
| Zinc (Zn) coating | 7440-66-6 | 5 % Max. | 5.0 as fume | 5.0 as fume |

Note: The above listing is a summary of elements used in alloying steel. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts.

II. PHYSICAL DATA

| | | | |
|--|---|--|--|
| Material is (At Normal Conditions): <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Solid <input type="checkbox"/> Gas <input type="checkbox"/> Other | | Appearance and Odor: Gray-Black with Metallic Lustre - Odorless | |
| Acidity/Alkalinity: pH = N/A | Melting Point: Approx. 2750°F Boiling Point: N/A | Specific Gravity (H ₂ O = 1) - 7 Solubility in Water - N/A | Vapor Pressure (mm Hg at 20°C): N/A |

III. PERSONAL PROTECTIVE EQUIPMENT

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| Respiratory Protection: NIOSH approved dust/mist/fume respirator should be used during welding or burning if OSHA PEL or TLV is exceeded. | Hands, Arms, and Body: Use appropriate protective clothing such as welders aprons & gloves when welding and burning. Check local codes |
| Eyes and Face: Safety glasses should always be worn when grinding or cutting; face shields should be worn when welding or burning | Other Clothing and Equipment: As required |

IV. EMERGENCY MEDICAL PROCEDURES

| | |
|---------------|---|
| Inhalation: | Remove to fresh air; if condition continues, consult physician. |
| Eye Contact: | Immediately flush well with running water to remove particulate; get medical attention |
| Skin Contact: | If irritation develops, remove clothing and wash well with soap and water. If condition persists, seek medical attention. |
| Ingestion: | If significant amounts of metal are ingested, seek medical attention. |

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V. HEALTH/SAFETY INFORMATION

| HEALTH | | | |
|---|-----------------------------------|---|-----------------------------|
| <p>Steel products in the natural state do not present an inhalation, ingestion, or contact health hazard. However, operations such as welding, burning, sawing, brazing, grinding, and possibly machining, which result in elevating the temperature of the product to or above its melting point or results in the generation of airborne particulates may present hazards. The above operations should be performed in well ventilated areas. The major exposure hazard is inhalation.</p> <p>Effects of overexposure are as follows:</p> <p>Acute: Excessive inhalation of metallic fumes and dusts may result in irritation of eyes, nose, and throat. Also high concentrations of fumes and dusts of iron-oxide, manganese, copper, zinc, & lead may result in metal fume fever. Typical symptoms consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever, and usually last from 12 to 48 hours.</p> <p>Chronic: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the element:</p> <p style="padding-left: 40px;">Iron (iron-oxide) – Pulmonary effects, siderosis. Manganese – Bronchitis, pneumonitis, lack of coordination. Chromium – Various forms of dermatitis, inflammation and/or ulceration of upper respiratory tract., and possibly cancer of nasal passages and lungs. Based on available information, there does not appear to be any evidence that exposure to welding fume induces human cancer. Nickel – Same as Chromium. Copper – Pulmonary effects. Vanadium – No reported cases of exposure to Vanadium. Cobalt – Inhalation of cobalt dust may cause an asthma-like disease with cough and dyspnea. Molybdenum – Pain in joints, hands, knees and feet. Tungsten – Some evidence of pulmonary involvement such as cough. Lead – Prolonged exposures can cause behavioral changes, kidney damage, periphery neuropathy characterized by decreased hand-grip strength and adverse reproductive effects. Zinc – None reported</p> | | | |
| Occupational exposure limits: See Section I. | | | |
| FIRE AND EXPLOSION | | | |
| Flash Point: N/A | Auto ignition temperature: N/A | Flammable limits in air: Lower: N/A Upper: N/A | Extinguishing Media: N/A |
| Fire and Explosion hazards: None | | Extinguishing Media NOT to be used: N/A | |
| REACTIVITY | | | |
| Stability: <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable | | Incompatibility (Materials to Avoid): Reacts with strong acids to form hydrogen gas. | |
| Conditions to Avoid: Non-ventilated areas when cutting, welding, burning, or brazing; avoid generation of airborne dusts and fumes. | | | |
| Hazardous Decomposition Products: Metallic Oxides. | | | |

VI. ENVIRONMENTAL

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| Spill or leak procedures: N/A | Special Precautions: Use good housekeeping practices to prevent accumulation of dust and to keep airborne dust to a minimum. |
| Waste Disposal Method: Dust, etc. – follow federal, state and local regulations regarding disposal. | |

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